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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/537,308	03/29/2000	Jong Uk Choi	10862-0001-2	7111

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EXAMINER	
JACKSON, JAKIEDA R	

ART UNIT	PAPER NUMBER
2655	6

DATE MAILED: 02/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/537,308	CHOI ET AL.	
	Examiner	Art Unit	
	Jakieda R Jackson	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 March 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/10-24-00*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

2. **Claim 5** is objected to because of the following informalities:

- The word "an" between the words "multiplying" and "information" should be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1-24** are rejected under 35 U.S.C. 103(a) as being unpatentable by Cox et al. (U.S. Patent No. 5,930,369), hereinafter referenced as Cox in view of Senoh (U.S. Patent No. 6,240,121).

Regarding **claim 1**, Cox discloses a digital watermarking method and apparatus for inserting a watermark signal into audio signal data (column 1, lines 8-46 and column 2, lines 15-32), comprising:

Fourier transforming audio signal data in the frequency domain (column 6, lines 1-10 and column 9, lines 6-19)

wavelet transforming absolute values of said first components (|w* sub i|) to generate first spectral coefficients (inherent in selecting frequency regions; column 11, line 66 – column 12, line 12 and column 10, lines 14-16);

discrete cosine transforming (DCT) a watermark signal to generate second spectral coefficients (inherent in selecting frequency regions; column 11, line 66 – column 12, line 33 and column 10, lines 14-16); and

combining said first spectral coefficients and said second spectral coefficients (all values of x sub i; column 10, lines 17-24), but lacks Fourier transforming audio signal in a form of first and second components and fails to inverse wavelet transform the combined coefficients.

Senoh discloses a digital watermarking method and apparatus for inserting a watermark signal into audio data (sounds; column 1, lines 8-12), comprising:

Fourier transforming audio signal in a form of first components and second components (column 2, lines 28-44), to obtain a signal containing watermark embedded data; and

inverse wavelet transforming (inverse wavelet transforming section; figure 1, element 31) the combined coefficients (column 6, lines 47-51), to receive signals and transfer the signals into an image with embedded watermark data.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cox's invention such that it Fourier transforms audio signals in a form of first and second components and inverse wavelet transforms the combined coefficients for inserting watermark data in such a manner that the watermark data cannot be easily detected and such that the watermark is hardly visible and/or audible (column 4, lines 48-56).

Regarding **claim 2**, Cox discloses the method and apparatus wherein said first components (image data) and second components (image watermark data) are the magnitude (column 10, lines 54-67) and phases of coefficients respectively (variance; column 11, lines 1-20).

Regarding **claim 3**, Cox discloses a digital watermarking method and apparatus but lacks wherein said step of combining includes a step of performing a weighted addition of said first and second spectral coefficients. Senoh discloses the method and apparatus wherein said step of combining includes a step of performing a weighted addition (figure 1, element 23) of said first and second spectral coefficients (transformed coefficients (frequency components); column 6, lines 18-65), to add the watermark data and the output signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cox's invention such that it performs weighted

addition of said first and second spectral coefficients to output a signal containing embedded watermark data (column 6, lines 39-51).

Regarding **claims 4 and 13**, Cox discloses a digital watermarking method and apparatus for inserting a watermark signal into audio signal data but lacks the method and apparatus further comprising inverse Fourier transforming the output of said inverse wavelet transforming by using said phases of coefficients. Senoh discloses the method and apparatus further comprising inverse Fourier transforming (inverse transform section; figure 1, element 3) the output of said inverse wavelet transforming (31) by using said phases of coefficients (column 6, lines 47-51), to receive a signals and transfer the signals into an image with embedded watermark data.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cox's invention such that it comprises inverse Fourier transforming the output of said inverse wavelet transforming by using said phases of coefficients to insert watermark data in such a manner that the watermark data cannot be easily detected and such that the watermark is hardly visible and/or audible (column 4, lines 48-56).

Regarding **claims 5 and 10**, Cox discloses a digital watermarking method and apparatus for inserting a watermark signal into audio signal data but lacks the method and apparatus further comprising multiplying information from said first spectral coefficients to said second coefficients prior to combining step. Senoh discloses a method and apparatus further comprising multiplying information (multiplication section; figure 1, element 22) from said first spectral coefficients to said second coefficients

(transformed coefficients) prior to combining step (add; column 6, lines 18-65), to obtain a uniform spectrum.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cox's invention such that it multiplies the information from said first spectral coefficients to said second spectral coefficients prior to combining step in order to obtain a uniformly spread spectrum in the restored original signal (column 1, lines 27-39).

Regarding **claims 6 and 11**, Cox discloses a digital watermarking method and apparatus for inserting a watermark signal into audio signal data but lacks the method and apparatus further comprising multiplying a scaling factor to said second spectral coefficients prior to said combining step. Senoh discloses a method and apparatus further comprising multiplying a scaling factor (pseudo random numbers) to said second spectral coefficients (signal B sub i) prior to said combining step (column 7, lines 5-40), making the pattern difficult to detect.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cox's invention such that it multiplies a scaling factor to said second spectral coefficients prior to said combining step to make the pattern difficult to detect in order to prevent unauthorized detection of the watermark data (column 7, lines 5-19).

Regarding **claims 7 and 12**, Cox discloses the method and apparatus wherein said scaling factor is in the range of 0.01~0.05 (alpha = 0.01; column 10, lines 14-18).

Regarding **claims 8 and 14**, Cox discloses a digital watermarking method and apparatus for inserting a watermark signal into audio signal data but lacks the method and apparatus wherein the information is a function of the sign of said first spectral coefficients. Senoh discloses the method and apparatus wherein the information is a function of the sign (polarity) of said first spectral coefficients (coefficients B sub i; column 8, lines 28-40), in order to obtain real numbers.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cox's invention such that the information is a function of the sign of said first spectral coefficients to obtain real numbers and not binary values in order to obtain the simplest wavelet transform (column 8, lines 28-40).

Regarding **claim 9**, Cox discloses a digital watermarking method and apparatus for inserting a watermark signal into audio signal data (column 1, lines 31-46), comprising:

a means for wavelet transforming absolute values of said first components (|w* sub i|) to generate first spectral coefficients (inherent in selecting frequency regions; column 11, line 66 – column 12, line 12 and column 10, lines 14-16);

a means for discrete cosine transforming (DCT) a watermark signal to generate second spectral coefficients (inherent in selecting frequency regions; column 11, line 66 – column 12, line 33 and column 10, lines 14-16);and

a means for combining said first spectral coefficients and said second spectral coefficients (all values of x sub i; column10, lines 17-24) but lacks a means for Fourier

transforming audio signal data into amplitude components and phase components and inverse wavelet transforming the combined coefficients.

Senoh discloses a digital watermarking method and apparatus for inserting a watermark signal into audio data (sounds; column 1, lines 8-12), comprising:

a means for Fourier transforming audio signal data into amplitude components (amplitude) and phase components (varied in frequency components; column 4, lines 31-47), to make it difficult to detect watermark data; and

inverse wavelet transforming (31) the combined coefficients (column 6, lines 47-51), to receive a signals and transfer the signals into an image with embedded watermark data.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cox's invention such that it Fourier transforms audio signals into amplitude and phase components and inverse wavelet transforms the combined coefficients for inserting watermark data in such a manner that the watermark data cannot be easily detected and such that the watermark is hardly visible and/or audible (column 4, lines 48-56).

Regarding **claims 15 and 20**, Cox discloses a method and apparatus for extracting a watermark from a watermark-embedded audio data (column 1, lines 31-47), comprising:

Wavelet transforming the absolute magnitudes of said first components of said watermark-embedded audio data (D*) and said original audio data (D) respectively (column 10, lines 31-67);

taking the differences between wavelet-transform coefficients of said watermark-embedded audio data (watermark images) and said original audio data (column 4, lines 36-56); and

inverse-discrete cosine transforming said differences (inherent in DCT transforming; column 4, lines 36-67) but lacks Fourier transforming a watermark-embedded audio data and original audio data to generate first components and second components respectively.

Senoh discloses a method and apparatus for extracting (extractor; figure 8, element 63) a watermark from a watermark-embedded audio data (column 2, lines 1-6), comprising:

Fourier transforming (Fourier transformer) a watermark-embedded audio data and original audio data (column 1, lines 48-60) to generate first components and second components respectively (column 2, lines 28-49), to obtain a signal containing watermark embedded data.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cox's invention such that it discloses Fourier transforming a watermark-embedded audio data and original audio data to generate first components and second components respectively to allow the watermark data to be hardly visible and/or audible and difficult to remove by unauthorized means and yet esily detectable through an authorized or intended procedure.

Regarding **claims 16 and 21**, Cox discloses the method an apparatus further comprising multiplying the sign (-1, 0 or 1 and sign) of said wavelet-transform

coefficients associated with said original audio data (original watermark) to wavelet-transform coefficients associated with said watermark-embedded audio data (extracted mark W*; column 11, lines 1-65).

Regarding **claims 17 and 22**, Cox discloses the method and apparatus further comprising multiplying a scaling factor (alpha) to wavelet coefficients associated with said watermark-embedded audio data (equation 2; column 9, line 60 – column 10, line 30).

Regarding **claims 18 and 23**, Cox discloses the method and apparatus wherein said sign is obtained by using signum function (-1, 0 or 1; column 11, lines 57-59).

Regarding **claims 19 and 24**, Cox discloses multiple scaling parameters (column 10, lines 17-24) but does not show the scaling factor in the range 20~100, for greater robustness.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cox's invention such that it shows the scaling factor in the range 20~100 to determine the distortion caused by a number of attacks on the original image, for greater robustness (column 10, lines 32-41).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jakieda R Jackson whose telephone number is 703.305.5593. The examiner can normally be reached on Monday through Friday from 7:30 a.m. to 5:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis I. Smits can be reached on 703. 306-3011. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRJ
February 4, 2004

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